The Imperial Forestry Institute University of Oxford

TWENTY-NINTH ANNUAL REPORT

1952-53

Oxford
THE HOLYWELL PRESS, LTD.
1954

COMMONWEALTH MYCOLOGICAL INSTITUTE
11 MAR 1954

The Imperial Forestry Institute University of Oxford

TWENTY-NINTH ANNUAL REPORT

1952-53

UNIVERSITY OF OXFORD

TWENTY-NINTH ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE ACADEMIC YEAR, 1952-53

Students. The number attending throughout the year was 55. In addition, two senior Forest Officers from Thailand spent two months at the Institute, sponsored by the Food and Agriculture Organisation of the United Nations. Another Forest Officer from Thailand, also sponsored by F.A.O., spent a short time working in the Forest Herbarium before going on to the Royal Botanic Gardens, Kew, for further study. One Colonial Administrative Officer on a special course spent some time studying forestry. One student, deputed by the Colonial Office to study ecology, divided his time between the Departments of Agriculture, Botany and Forestry.

Twelve students were successful in the examination for the Forestry Honours Degree, the classes obtained being one First, three Seconds, four Thirds, and three Fourths, with one other successful but not classed owing to his having been too long in residence. Of these twelve, two were Colonial Forest Probationers and returned to their Colonies, one was a Government Scholar from British Guiana and returned there, another was a Government Scholar from New Zealand and is returning to that Dominion. Of the remainder, four have obtained posts in the Forestry Commission, three in the Colonial Service and one is still seeking a post.

There were 11 students in the junior year.

The Colonial Forest Officers' course was attended by 21 Forest Officers from Nigeria (7), Gold Coast (1), Sierra Leone (1), Tanganyika Territory (3), Northern Rhodesia (2), Uganda (2), Mauritius (1), British Guiana (2), Trinidad (1), Fiji (1).

Only one Indian Forest Officer (Bengal) and one Pakistani Forest Officer (Punjab) attended the course arranged for them.

A junior Forest Officer from Thailand also spent a year here and is now working at the Forest Products Research Laboratory, Princes Risborough.

The educational background of the students for all categories is gradually returning to what was normal before wartime conditions imposed various limitations and omissions. Thus among those attending the postgraduate course of recent years, none have had any experience of continental forests, but this year several had, and next year the majority will have seen something of them. Changes consequent on increase of staff and greater attention at the University

Schools to certain subjects such as ecology and statistical method, also necessitated recasting some of the courses. On the other hand, among the junior students, we now have the two years' delay for National Service in the majority of cases.

Research Students. After the end of the year two students have submitted their theses for the degree of D.Phil. The theses are entitled 'Some Aspects of the Mesofaunal Population of Moorland Soils, with Particular Reference to the Influence of Certain Species in the Pedology of the Soils,' and 'The Volume Basal Area and its Uses in Forest Mensuration.' Three students presented theses for the Diploma in Forestry. The subjects are 'Protection afforded by a Light Mulch against Soil and Water Loss,' 'An Investigation of the Growth Ring Characteristics shown by Pine in East Anglia,' and 'A Study of Degrade in Oak Logs due to Ambrosia Beetles, together with Observations on the Biology of the Beetles and their Associated Fungi.'

Prizes. The Schlich Prize for the best all-round Officer attending the postgraduate course was awarded to E. N. G. Cooling, Northern Rhodesia.

Instructional Tours. (1) *The Introductory Tour in Britain* for students about to start their forestry course and for those overseas students not familiar with British forests and forestry, was made just before Michaelmas Term. The tour was conducted by Mr. Edwardson and joined by the Professor and Colonel Lloyd for part of the time. The tour included a visit to the estate of Sir Richard Cotterell in Herefordshire.

(2) *Western France.* Ten first year students, together with four Forest Officers from India, Pakistan, Cyprus and Thailand, visited the forests of Normandy and the Landes. The tour was conducted by Dr. Jones.

(3) *Eastern France and Switzerland.* Following last year's successful experiment, the senior year students again visited the Vosges and Jura during Easter Vacation. The tour was conducted by Dr. Jones and Mr. T. E. Edwardson, with thirteen students and one Pakistani Forest Officer.

(4) *Postgraduate Tour in Great Britain.* The Forest Officers, together with three officers from India, Cyprus and Thailand made a short tour in Easter Vacation, under the leadership of the Professor and Colonel Lloyd. They visited the field work being done by the Imperial Forestry Institute staff in the Broxa and Wykeham areas of Yorkshire and the experimental work on heathlands in Allerston Forest being carried out by the Forestry Commission. They also visited Messrs. Gordon Jacob's sawmill and fibreboard machinery at Queensferry, and saw something of the extraction and transport of softwoods from plantations on the Liverpool Water Catchment area at Lake Vyrnwy. They also saw the provenance experiments in Radnor Forest and ended the tour with a visit to Sir Richard Cotterell's estate in Herefordshire. The thanks of the Department are due to the various landowners, and officials of the Forestry Commission

who permitted the students to visit their forests and facilitated other arrangements.

(5) *Germany and Austria.* For the first time since the war, it was possible this year to take a party of Forest Officers to Western Germany and Austria. Professor Champion conducted the German part of the tour, arrangements for which were kindly made by Ministerialdirektor Mann of the Bundesministerium für Ernährung, Forstwirtschaft und Forsten in Bonn. The City of Frankfurt also extended generous hospitality to the party.

The Austrian part of the tour was conducted by Colonel A. H. Lloyd. Arrangements were made with the collaboration of Sir Harold Caccia of the British Embassy in Vienna and Dr. Ing. Rudolph Ender of the Bundesministerium für Land- und Forstwirtschaft in Vienna and the Rektor of the Hochschule für Bodenkultur, to whom thanks are due.

Working Plans. The practical work was again carried out in the New Forest from the Forestry Commission hostel, Northerwood House.

Utilisation Course. The course for senior students at the Forest Products Research Laboratory, was, as in previous years, arranged for the Christmas Vacation. Special thanks are due to the Director for the arrangements made, and to those of the staff who gave demonstrations, etc.

Vacation Practical Work. During the first two years of their forestry course, all students are expected to carry out practical work in the forests during the Long Vacations. Two students were employed in the Forestry Commission woods in Wales, but it was found difficult to arrange for suitable work in other Commission forests during July and August. There are, of course, no felling or planting operations at this period and weeding and brashing operations are not particularly instructive for students. This year arrangements were made for four students to do forestry work in Eastern Canada, thanks to the good offices of Dean Sisam of the Forestry School of Toronto University.

Private woodland owners in Norway again kindly provided work for five students. Thanks are due to Løvenskiold-Fossum, Skogsjef Lunde, Fossum pr. Skien, and Løvenskiold-Vaerkerø, Vaerkerø, Skøyen, for again receiving our students and providing them with several weeks' employment. The remainder of the students found employment in Great Britain on private estates or with forestry consultants. The experience gained during this practical work is of great value to the students and considerably facilitates their academic studies.

Excursions. During the summer term, an excursion was made with the senior and postgraduate students to Lord Bathurst's estate at Cirencester. The postgraduate students also visited Alice Holt Research Station, Messrs. Hunting Aero-Surveys Ltd. at Boreham Wood, the sawmills of Messrs. W. W. Howard Bros. and Co. at Southampton, mixed woods at Savernake Forest, Rothamsted

Experimental Station, and Messrs. Mallinson & Sons' timber yards. The senior students visited furniture factories at High Wycombe, the Forestry Commission Woods at Bramshill, and Hazelborough.

The junior year students visited local woods as usual, mainly to study soils and silviculture with Dr. Jones. Wytham Wood has again proved very useful for demonstration purposes.

Thanks are tendered to all those who kindly permitted students to visit their woods and works.

Discussions. Sixteen open discussions of forestry topics of general interest were organised for the Colonial Forest Officers and other Dominion Officers under the leadership of each in turn. Short papers were read during Trinity Term on selected topics, by the same group, each paper being followed by questions and general discussion. The same method was followed during Hilary Term by the senior students, each student presenting an account of his 'special subject.'

Seminars on Regeneration of Tropical Forests. Three seminars were arranged during Hilary Term, as preferable to a lecture course.

Visiting Lecturers. As usual, a series of lectures was arranged, principally for the post-graduate course, dealing with various forestry problems not usually dealt with by the staff of the Department of Forestry. The lectures were followed by questions and discussion. The subjects dealt with were Forest Genetics (2 lectures), Soil Conservation measures, South African Wattle Plantations, Organisation and Administration of State Forestry in Great Britain, Marketing of Colonial Timbers, Modern Weather Forecasting, Wood Pulp and Paper Industry for the Tropics, Primitive Man in relation to the Forest, Termites, the Swollen Shoot Disease of Cacao, the Climax Concept, Rural Re-settlement in British Tropical Africa and the Work of the Nature Conservancy. The Department is greatly indebted to the Lecturers who spared time to give the students the benefit of their expert knowledge.

ASSISTANCE FROM OTHER DEPARTMENTS

Commonwealth Foresty Bureau. Immediately before the beginning of Michaelmas Term a short introductory course on documentation and a fuller course for those specially interested were given by the staff of the Commonwealth Forestry Bureau.

Special courses in Surveying and Soil Science were given by members of these two Departments to the forestry students and Mr. Hammersley, Graduate Assistant to the Lecturer in Design and Analysis of Scientific Experiment, and the Demonstrator in Colonial Agriculture (Mr. Masefield) also gave courses to the senior year and postgraduate students. The Reader in Animal Ecology (Mr. Elton) conducted three discussions with the junior year and postgraduate students. The thanks of the Department are extended to all lecturers concerned, and to the Heads of their Departments.

Assistance given to other Organisations

The Professor again lectured on Colonial Forestry to the Colonial Administrative Service Cadets at both Oxford and Cambridge Universities.

Library. Amongst various activities of the year may be mentioned the collecting into special shelves of some of the more valuable old books, for greater protection. A microfilm and photostat collection has been begun.

Staff Tours. In addition to the instructional tours mentioned above, tours were made by three members of the staff in connection with their research and teaching work or to take part in Conferences. Dr. Jones made a short tour in Algeria during the Easter Vacation between finishing with one student party in S.W. France and starting with another party in the Jura. Mr. MacGregor attended an International Conference of Agricultural Economists visiting Quebec, Ontario, Michigan and Illinois and had opportunities of meeting forest economists of Canada and the U.S.A. Mr. Thompson made a tour in Scotland to take part in a survey of the forest insects in a remnant of the Old Caledonian Forest which has come under the Nature Conservancy.

Research Field Station. The Yorkshire station at Wykeham has again been used by members of the research staff. It has still been impossible to secure the installation of electricity. Acknowledgment is made of the help given by the Research Forester, Mr. Weatherell.

Scientific Societies, etc. Members of the staff have been active on the Councils and Committees of various societies, as in previous years.

Government Committees. The Professor continues to serve on the Forestry Commission's Research Advisory Committee, and on the Colonial Office Committee for Colonial Agricultural, Animal Health and Forestry Research. Both the Professor and Mr. N. V. Brasnett serve on the Colonial Office Forestry Committee. Mr. J. J. MacGregor continued to serve on the Working Party of Forestry and Agriculture of the Government Technical Committee on Natural Resources—the final report has now been published.

Senior Staff. There have been no changes in the senior staff during the year. Dr. Chalk was absent during Michaelmas Term owing to illness, and the Department is again indebted to Mr. B. J. Rendle of the Forest Products Research Laboratory who gave a course of lectures in Wood Structure and to the Director of the Forest Products Research Laboratory for permitting Mr. Rendle to fill the serious gap which would otherwise have existed in the lecture list.

Technical Staff. There are now eleven technical assistants for the eight laboratories, plus a workshop staff of three and the Photographic and Artist's Sections also with three assistants.

Secretarial Staff. There has been little change in the secretarial staff during the year.

WYTHAM WOODS

Concentrated planting work has moved from the completely blank areas to the major gaps in the irregular old oak woods, some of the more defective trees being removed beforehand. This has reduced the area actually planted during the year from 15 to 10 acres, but involves considerably more labour and cost per acre for clearing the ground for planting, and fencing against rabbits. Progress was made in catching up on the programme of thinnings in the younger pole crops, and was much helped by the better equipment now available, notably the Fordson tractor which can be used on a number of different operations and saves much manual labour. Timber sales have been seriously affected by a fall in the market and lack of demand for the poorer qualities which are all we have to offer: the proposed sale of 78 trees has had to be held over another year. A new nursery near the Forester's house has given excellent results and will largely replace the original one on the top of the hill.

BAGLEY WOOD

The Institute continued to have valuable facilities available in the Wood, thanks to the courtesy of St. John's College. Mr. Edwardson dealt with the objections raised by the Forestry Commission to the draft Working Plan, mainly to the effect that the replacement of inferior old trees by new stock, with resultant increase of quantity and quality of increment, should take priority over the normal management requirement for spreading out the limited stocks of timber trees to ensure a continuous supply in the future. Once again the Forestry Commission's Kennington research nursery on the edge of Bagley Wood has been most useful for the demonstration of nursery techniques and research, and the extremely competent work of Mr. W. G. Gray, who is in charge, has been of the greatest assistance to the Institute.

SILVICULTURE

During the academic year 1952-53 Dr. E. W. Jones gave the usual courses in silviculture and forest ecology, and conducted practical classes in Bagley and Wytham Woods; he also conducted the tours for first year students in Western France and second year students in Eastern France and Switzerland.

During the Easter Vacation he made a profitable study-tour in Algeria.

Work resulting from the expedition to Nigeria in 1947-48 is now nearly complete.

With the collaboration of A. J. Grayson, the enclosure award maps and other early documents relating to Wytham Wood have been studied and it has been possible to construct an historical account and map which it is hoped to publish shortly.

ECOLOGY

The usual joint undergraduate course was given by Dr. E. W. Jones, Mr. A. C. Hoyle and the Professor. Dr. G. W. Dimbleby gave a course of lectures in Ecology to the postgraduate students. As the background of students taking this course has substantially changed in recent years, the more elementary aspects of the subject need no longer be dealt with in this course, and it has been possible to recast it at a more advanced level.

Dr. Dimbleby's ecological programme was seriously dislocated this year through his prolonged absence owing to illness; nevertheless, intensive work has continued on various techniques and field work has been carried out in Yorkshire and the New Forest, as well as locally.

A Diploma student has been working on the ecological status of unenclosed oakwoods in the New Forest, with particular reference to the development of the soil profile.

Unfortunately the value of the Research Field Station at Wykeham has been greatly impaired owing to the failure of negotiations to introduce mains electricity from the grid which passes within 100 yards of the laboratory. It may be necessary to fall back again on our own power unit.

Tree Physiology. Courses of lectures were given in Physiology and in Soil Biology by Dr. Leyton.

The investigations into the growth and nutrition of spruce and pine on heathland plantations were more or less completed but a certain amount of work is still being continued, particularly on the nitrogen metabolism of the spruce. The main investigations have been extended to include a study of root metabolism with a view to establishing the influence of certain soil properties on the rooting habits of the trees. Preliminary investigations into the respiration of excised roots of Sitka spruce and Scots pine, for example, indicate important differences in the reaction of these species to low oxygen tensions. Whereas Scots pine roots are affected only to a relatively slight extent, the respiration of Sitka spruce roots falls considerably: this would appear to be of some significance in determining the rooting habits of the trees in compacted or otherwise poorly aerated soils. It is hoped to continue these studies in more detail and with a number of tree species.

Microbiology. A fungus has been isolated from the litter of the surface layer of raw humus formed by *Calluna vulgaris,* which has produced a sporophore when grown on autoclaved beechwood sawdust. The sporophore has the characteristics of *Hypholoma fasciculare*—a species whose sporophores are not observed on the heathland which provided the material from which the organism was isolated. This organism produces white rot in sawdust. There are therefore in the mor formed from the litter of *Calluna vulgaris* organisms which could bring about the disappearance of vascular tissue as observed in the litter of *Calluna vulgaris* from such sites:

this result supports the hypothesis that mor formation should not be attributed to the accumulation of lignified plant remains.

The litter of different plant species disappears from the surface of the soil at very different rates after leaf fall. The reason for this is being studied by both field and laboratory investigations which are only in the exploratory stage at present. An attempt is being made to follow the sequence of events during the disappearance of the litter of various species, including herbaceous and shrubby species, having markedly different rates of disappearance. Differences in the colonisation of the litter of various species by the various groups of organisms concerned in the decomposition of litter are being looked for as a basis for an investigation of the reasons for more rapid disappearance in some cases. It is hoped that information obtained from these studies will be of assistance in further investigation of the mull $\rightleftharpoons$ mor system.

SOIL SCIENCE

As in previous years, the Reader in Soil Science, Dr. E. W. Russell, and Mr. R. G. Clarke, gave special undergraduate courses of lectures for forestry students, and Dr. Russell also gave a course on tropical soils.

During the past year Mr. P. J. Rennie has been mainly engaged on the analysis and interpretation of four years' field data from the moorlands of the North Riding of Yorkshire. Routine laboratory work on the soils of the area has continued, and techniques for the extension of the studies on to other moorland areas have been examined.

Outstanding features of these moorland soils and the effects of afforestation within the area revealed by the work done, include the following :

(1) All soil horizons of the *Calluna* profile are very poorly aerated and highly water-saturated throughout the year, except for enhanced aeration of the raw humus during dry summer periods.

(2) The soils of plantations with closed canopies varying in age between twenty and eighty years, established with or without cultivation, show better soil aeration than the *Calluna* moor at all times of the year. This increased aeration results from decreased water content, as for all coniferous and deciduous species sampled there was no increase in total porosity.

(3) Certain types of forest ploughing, especially with a 'deep single furrow,' increase aeration of the upper soil horizons at all times of the year. The raw humus 'sandwich' resulting from ploughing does not show the low aeration of the undisturbed *Calluna* raw humus during the greater part of the year, and during summer drought possesses a greater water content than the undisturbed *Calluna* raw humus.

(4) All soil horizons of the *Calluna* moor profile show less 'available' bases than those recorded by using comparable methods for

other European podzols. The major part of the available bases is confined to the soil horizons above the shallow (27 cm.) ironpan. Mobile aluminium, and to a lesser extent iron, were present in concentrations, relatively high compared with calcium, in all horizons except the raw humus.

(5) Older plantations (*ca.* 60 years) of coniferous and deciduous species upon a former *Calluna* moor have produced heavy litter layers ranging from 7 metric tons of oven-dried litter per acre with birch to 9 tons with oak, and 15 tons with Scots pine. Although the different mineral composition of the leaves of the various species partially accounts for the higher calcium content of the decidous litter as compared with that of the coniferous species, *viz.* 53 kg. per acre (oak), 27 (Scots pine), the higher base content is not sufficient to raise the pH value of these litters above 3.7 with oak and 3.2 with birch, as compared with 3.1 for Scots pine. This appears to indicate that on these sites where the available supply of bases is very low, a cover of deciduous species can ameliorate conditions to only a limited extent.

FOREST BOTANY

Mr. A. C. Hoyle continued as Curator of the Forest Herbarium, and Mr. F. White as Forest Botanist with Mr. A. Angus to assist him in the preparation of the *Check-list of Trees and Shrubs of Northern Rhodesia*. During the summer of 1952, after three years of useful and industrious service, Mr. V. W. Pearson was forced by ill-health to resign his post as Herbarium Assistant; he was replaced in August 1952 by Miss M. E. Griffiths, a graduate in Botany from Sheffield. The mounting and secretarial staff remained unchanged.

Teaching. Mr. Hoyle continued to give the usual lectures and practical courses in Systematic Botany and the Ecology of Dry Tropical Woodland to first-year students, two of whom also availed themselves of facilities for further study and instruction in the Herbarium. The Professor lectured on the Moist Tropical Forests.

More students than usual worked in the Herbarium and received special instruction in tropical botany. An undergraduate course in Regional Systematic Botany (Gold Coast), as an optional paper in the Final Honour School, was run for the first time, and another student studied the Nyasaland flora; Mr. E. C. Clarke, a Colonial Forest Officer from British Guiana, worked on the *Lauraceae;* Mr. R. G. Atwell of the Northern Rhodesian Game and Tsetse Department studied the woody flora of the Nyika Plateau; Mr. D. Clayton studied the most important African woody families and genera as part of his training as an ecologist in the Colonial Service; Mr. T. Smitinand of the Thailand Forest Service studied in the Herbarium for five weeks under the auspicies of the Food and Agriculture Organisation of the United Nations, receiving supervision from Mr. Hoyle.

Visitors. Mr. R. W. J. Keay and Dr. F. R. Irvine continued to visit the Herbarium in connection with their work on *The Flora of West Tropical Africa* and *The Woody Plants of the Gold Coast*

respectively. Mr. D. B. Fanshawe spent a week in the Herbarium on transfer from British Guiana to Northern Rhodesia.

Research and Advisory Work. Mr. A. C. Hoyle continued his special study of *Brachystegia,* receiving and naming large collections, especially from Kew, Brussels, the British Museum and Lisbon. His naming of Angolan specimens provided the basis of Dr. Rocha de Torre's treatment of this genus in the *Conspectus Florae Angolensis.* Collaboration has also been continued with Mr. J. K. Jackson, Silviculturist, Anglo-Egyptian Sudan, in the naming of his collections; with Belgian botanists working on the *Flora of the Congo,* and with members of the Commonwealth Forestry Departments concerning various genera and species requiring special attention.

Mr. Angus has made appreciable progress in his studies of *Grewia* and *Ficus* largely on the basis of his own collections and observations made in Northern Rhodesia. Mr. White continues his revision of *Diospyros* (including *Maba*).

While Mr. White was in Africa, Mr. Hoyle represented the Herbarium on the Nomenclature of Hardwoods Committee of the British Standards Institute. Mr. White resumed his place on the Committee when he returned in December.

Northern Rhodesian Check-list. Mr. White was in Rhodesia from December, 1951, to December, 1952, and Mr. Angus from July, 1952, to January, 1953. All parts of the territory were visited and 3,514 numbers (six duplicates of each) were collected. In addition 539 bark specimens, 229 wood specimens and 241 carpological specimens were obtained. Flowering or fruiting material preserved in spirit was collected for 323 species. The work of classifying the Herbarium specimens into families and genera, and sorting, classifying and labelling the bark, wood, carpological and spirit material occupied twelve weeks from January to April. Since then, 1,126 specimens have been named, 967 by the Forest Herbarium staff, and the remainder by botanists at Kew.

Forest Herbarium. The greatly improved accommodation in the new building is beginning to have an effect on efficiency in general as the collections gradually become more conveniently housed. In particular, part of the carpological collection has been transferred to new boxes during the year, and the rapidly expanding spirit collection largely re-organised and re-labelled.

734 specimens were received during the year for identification, and 716 named specimens were presented from other herbaria, principally from the East African Herbarium, Nairobi, the Jardin Botanique de Bruxelles, and the Hebrew University, Jerusalem.

The largest single accession consisted of the material collected in Northern Rhodesia by Mr. Angus and Mr. White (see above), together with an additional 663 specimens collected by members of the Northern Rhodesian Forestry Department.

1,492 specimens were poisoned, mounted and filed.

The number of identifications sent out totalled 465, a smaller figure than usual. The following territories received identifications:

Gold Coast (76), Kenya (3), Nigeria (92), Nyasaland (79), Northern Rhodesia (54), S. Rhodesia (60), Somaliland (12), Tanganyika (34), and Uganda (55).

FOREST PATHOLOGY

Mr. W. R. Day continued in charge of this section with no changes in staff.

Teaching. The usual courses of instruction were given for the Honour School and the special course in Forest Hygiene for the post-graduate students.

Research. Visit to Canada. Mr. Day was in British Columbia during the summer primarily to make a field study of Sitka spruce growing under natural conditions.

Opportunity was taken, when crossing Canada, to make contacts and carry out discussions at Ottawa and Toronto. Some days were spent at Ann Arbor, Michigan, where under the guidance of Professor Baxter the Huron National Forest was visited and something seen of problems involved in re-establishing the forest on the sand plains in N. Michigan. Interesting pathological excursions to the University forests were also made.

Some days were spent, under the guidance of Mr. R. H. Spilbury, in some of the Douglas fir forests in Vancouver Island and also in the Olympic Peninsula, through the courtesy of the United States Forest Service, seeing both Sitka spruce and Douglas fir. The need to investigate further the possibilities of Douglas fir for regions with a relative low summer rainfall is certainly suggested. There does, however, seem also to be a need for further study of the conditions of soil and climate in which it grows in the drier parts of its native range in the coastal region and also of the characteristics in this country of the strains of this species which occur there.

Cambial Injuries on the Main Stem of Conifers. An assessment was made by Mr. F. H. Jones of injuries of this type in Sitka and Norway spruce which grow in the bottom of a narrow valley in Glentress Forest, Peebleshire. Both species showed the same type of injury, *i.e.* the dying of bark, usually in long and rather narrow areas on the base of the main stem, and both were affected to a very similar degree. 23 per cent. of the trees as sampled, showed injuries, 6 per cent. being severely, or moderately severely injured. The incidence of the more severely injured trees is slightly less for Sitka spruce than has usually been observed for this type of damage at Drummond Hill, but much less than that for the same type of injury on Norway spruce in that forest. A very careful examination of two stems from the Glentress plantation showed that the first injuries occurred during the summer, but that the main extension of the injuries occurred at the very beginning of the growing season when cambial division was just beginning. At both times, death of the bark was accompanied by a collapse and rending of the tissues of the meristematic region and inner phloem. This, together with other anatomical evidence, indicates that the main cause of the injuries

was non-parasitic. Recent thinnings show that these trees, now rather more than thirty years old and still growing fast, are often beginning to be affected by butt-rot. This may be taken to indicate that die-back of roots has also occurred and it is possible that the initiation of the bark injuries in summer is indirectly related to this.

Further information on the incidence of this bark necrosis on the main stems of spruce was collected in Wales in the spring. The incidence is, generally, light, but it may be severe locally. Mr. D. K. Barrett discovered some cases of bark necrosis of the type discussed here on European larch in Coed-y-Brenin. The injuries are distinct in appearance from the cankers which commonly occur on this species. He also made some assessments of similar injuries on Japanese larch in Allerston Forest, Yorkshire.

It is hoped within the next year to write an account of this work and especially of the anatomical examinations upon which, up to the present, diagnosis has had to be made. The evidence that non-parasitic factors and usually low temperatures are the main causes of injury in this type of bark necrosis is to be found in the abnormal anatomy of affected stems. The general character of this damage is similar in different species; but the fungi which colonise the injured bark vary with tree species. It is highly probable that such fungi help to extend the injuries, though no evidence has come forward that their influence in this way is very great.

Observations on local climate in an area in which Japanese larch has been severely affected by cambial injuries. It was felt that observations on temperatures within an area affected by cambial injuries would be of interest and in any case might add usefully to our scanty data regarding local climates in forests in this country. Observations were made by Mr. D. K. Barrett in the Rhydymain section of Coed-y-Brenin, Merionethshire, in a part where Japanese larch had been severely injured at the very beginning of the growing season in 1942 after a brashing had been made. The observations were made over a nine day period at the end of March and the beginning of April, during which a cold wind was blowing with some snow. Some interesting relations between topographical position and temperature were shown. The indications obtained were that, while some slight injuries had been caused in appropriate places by radiation frost, the main damage was caused by exposure to cold freezing winds.

Root development and soil conditions in relation to the debility and dying of Norway and Sitka spruce. Mr. F. H. Jones, during a tour of the north of England and in Scotland examined sites in which spruce had died or were in poor condition. Part of this work was done in collaboration with Mr. Murray of the Forestry Commission Research Staff. These observations touch on a large problem which has been mentioned in three previous annual reports. The trouble may occur on a variety of soils, *e.g.* some are freely drained and may be deeply rooted, while others show marked impedance in drainage and may be shallowly rooted. The observations made in this case are

consistent with those made previously and indicate the need to pay attention to conditions for root development and supply if this problem is adequately to be understood. The problem, as one concerned with conditions for supply of the needs of the root, appears under different aspects according to local conditions. There is need for a much closer investigation of growth, and especially root development, in relation to soil conditions in these cases.

The dying of Lodge Pole pine on shallow peat soils. An examination was made in 1951 of some small plantings of Lodge Pole pine which grew on shallow peat overlying compact till on the Cheviot Hills. These plantations, which are now twenty-four years old, are surrounded by Sitka spruce of the same age growing on soil of the same type but still growing satisfactorily. The general indications are that poor physical conditions for root development in the shallowly rooted wet soil have been mainly responsible for the diseased condition of the pines. It appears that soil conditions exist which, though tolerated by Sitka spruce (at least as a small tree), are not really suited for the pine.

European larch. The first draft of a monograph on the cultivation of European larch in Britain was completed early in the year and is now under further consideration.

The work on the fungus ecology of larch canker, begun in Coed-y-Brenin, is being repeated in Mynydd Ddu Forest. The general results obtained in this forest are, so far, similar to those obtained in Coed-y-Brenin. It is plain that infection experiments with some of the mycelia isolated will have to be made and it is hoped to begin these during the coming year.

Collapse of wood owing to drought. An interesting case of this appeared in a small area of Japanese larch in southern Hampshire. This stands on a shallow but fertile and mainly organic soil which overlies a cemented gravel. Growth occurred normally until the period when crown competition began to be appreciable. Collapse was then extremely severe during the period in which reduction in diameter increment from the early fast rate was taking place. The type of collapse is more like that recorded by Lutz as occurring in white spruce growing over frozen sub-soils in Alaska (*J. Forestry,* 50:99-102, 1952) than Drought crack (*Report,* 1948-49). European larch on the same site but of greater age had also been affected, but less so. Japanese larch of the same planting but growing on more deeply rooted soil showed no sign of collapse. This phenomenon of internal collapse in standing trees has been observed on several occasions in Norway spruce growing in the southern part of England, but always to a slight degree.

A halt has now been called in field work in order that the information collected to date may be summarised during the coming autumn.

FOREST ENTOMOLOGY

Mr. G. H. Thompson continued in charge of this Section in which no staff changes occurred.

Teaching. The usual course of sixteen lectures in Forest Zoology, together with field demonstrations, was given to the junior year. The advanced course in Forest Entomology, comprising twenty lectures with practical periods, was attended by one student of the senior year, one Indian Forest Officer and one Diploma student.

The orderly storage of material was greatly facilitated by the construction of cupboard accommodation with sliding doors and adjustable trays, to contain the wood specimen collection.

Three twenty-drawer entomological cabinets were purchased for the reference collection of British forest insects initiated last year. Good progress was made with the preparation of specimens for this collection. Each species will be contained in an individual plastic tray, 3 in. by 3 in. or 3 in by 1½ in.: this system permits easy handling, the consolidation of the collection and the insertion of species.

Research. 100 ash and 100 sycamore billets 2½ ft. in length were laid down in Wytham Wood for a study of insect succession and hibernation in wood at successive stages of decay. Ten billets of each species will be lifted and analysed annually. Further experimental work was carried out in the measurement of radial increment using a dial-gauge dendrometer as a commencement of a study of the effect of insect attack on rate of growth.

In July a survey of forest insects, particularly those associated with Scots pine, was conducted on behalf of the Nature Conservancy on a remnant of the Caledonian pine forest in the Beinn Eighe estate in Western Ross. The wind-thrown forest areas around Aberdeen were also visited.

Other items. During the year discussions were held with the forest entomologists of the Forest Departments of Aberdeen and Edinburgh Universities and close and valued liaison was maintained with the entomologists of the Forestry Commission Research Staff and of the Forest Products Research Laboratory.

MANAGEMENT

The normal courses for undergraduates were conducted by Messrs. N. V. Brasnett and T. E. Edwardson, and supplemented by visits to managed forests in Normandy, the Landes, and the French and Swiss Jura. Six weeks were also spent in the New Forest collecting material for the preparation by each student of a working plan for 650 acres of forest.

Supervision was given to graduate forest officers carrying out advanced studies on various aspects of forestry involving management; the management and utilisation of the Sudan Savannah of Northern Nigeria; the use of Savannah reserves with particular reference to the Guinea Savannah of Western Nigeria; establishment and management of exotic plantations in the dry savannah areas of Northern Nigeria; forest reservation in Fiji; shifting cultivation in the Maracas Valley, Trinidad; and afforestation of arid areas.

During the celebration of the Rhodes Centenary advantage was

THE

ARY

taken of the presence in Oxford of Dr. W. C. Lowdermilk and others to hold a discussion on the teaching of range management in the university. It was agreed that the subject is one of increasing importance, which involves the study of soil science, plant and animal ecology, social structures and economics, as well as of agricultural, forestry and veterinary techniques. Sir Herbert Howard pointed out that ever since the days of Sir William Schlich its importance had been stressed in the School of Forestry, but that its detailed study needs previous practical contact with the problems involved, and hence is best dealt with in post-graduate courses. Reference was also made to the great lack of knowledge with regard to the management of grazing land in tropical Africa, and the need for research before effective instruction can be given. It was agreed that graduates well equipped in the fundamental sciences and in research techniques should be able to apply their knowledge to the problems involved and devise solutions.

MENSURATION

The usual undergraduate courses, including practical work in Bagley Wood, were given by Mr. T. E. Edwardson. An advanced course on selected points in mensuration was given to post-graduate students. Permanent sample plots of *Tsuga heterophylla* and *Picea abies* in Bagley Wood were remeasured, the former with the help of the Forestry Commission Mensuration Branch. Practical instruction was also given in the preparation of working plans and on excursions and tours.

Mr. Edwardson, with the help of field parties provided by the Deputy Surveyor, Forest of Dean and the Forestry Commission Mensuration Branch, completed a ten per cent. enumeration over 600 acres by random samples of the oak crop (age 41-160 years) in the Forest of Dean. A similar project is in hand for the oak in the High Meadow Woods (Dean).

Further amendments have been considered desirable in the Bagley Wood Working Plan for dedication under the Forestry Commission scheme, and Mr. Edwardson has prepared a final draft.

Instruments developed recently by Dr. Müller (Vienna) and Butterlich (Zell) for easy determination of basal area, tariff volumes and diameter above breast height were brought by Mr. Edwardson from Austria and are being tested.

Contacts were maintained with forest owners and forest consultants requiring respectively silvicultural and mensurational assistance.

STATISTICS

As last year, Mr. J. M. Hammersley gave a course of lectures on elementary statistics for Forestry students.

Miss Smith's work has proceeded satisfactorily and her services in computing have been in demand by various members of the staff and also some of the senior students. She still continues to give

part time service in the Department's general store, under Mr. F. H. Jones. She has been very useful in helping Mr. J. S. Shaw (artist) on occasions when there has been a great stress of work and is commended for her neatness and competence in this.

WOOD STRUCTURE

Dr. L. Chalk continued in charge of the section, but was absent during Michaelmas Term owing to ill health. Formal teaching during that term was kindly undertaken by Mr. B. J. Rendle of the Forest Products Research Laboratory, Princes Risborough. The usual undergraduate and post-graduate courses were given. One Diploma student and two Forest Officers carried out advanced studies in this subject which was also chosen as their optional Special Subject by two undergraduates.

Research. (1) *Sitka spruce.* A project was started to investigate the poor quality of the Sitka spruce timber grown on certain Forestry Commission sites. Preliminary work has been devoted mainly to developing techniques (*a*) for obtaining a series of moisture determinations from living trees throughout the growing season in widely separated parts of the country, and (*b*) for reducing the number of wood samples needed for anatomical investigation by studying variation within the stem. Mr. M. S. Ranatunga, from Ceylon, developed a satisfactory technique for sampling moisture contents and this is being applied to two good and two bad sites during the current season, with what promise to be very interesting results. The sampling problem was studied by Mr. J. A. Kininmonth from New Zealand.

(2) *Ray number.* A preliminary investigation was carried out on variation in the number of rays per centimetre in dicotyledonous woods and in the relation between ray size and number. This study has not yet been completed.

(3) *Uganda timbers.* Mr. K. W. Trenaman of the Uganda Forest Service prepared two lens keys to Uganda timbers, one of the standard 'punched card' type, and one in a dichotomous form, using easily seen characters and a simplified terminology.

(4) *'Male' and 'Female' Mvule.* Mr. K. W. Trenaman examined wood specimens and cytological material that he had collected in Busoga from what the sawmillers regard as two distinct types of Mvule, *Chlorophora excelsa.* There was little evidence of any clear difference in specific gravity or shrinkage, but there was a marked difference between the two types in the proportion of parenchyma and in its pattern of variation outwards from the pith.

(5) *Growth Rings in Pine.* Mr. E. H. M. Harris made a study, for a Diploma, of the different types of late wood in Scots pine grown at Thetford and their correlation with rainfall.

The Wood Collection. The principal additions to the wood collection were from the Colonial Forest Departments of Kenya, Nigeria, Sierra Leone and Tanganyika, and from the Forest Products

Research Laboratory, Princes Risborough, and the Royal Botanic Gardens, Kew. Arrears of material accumulated during the war have now been dealt with and added to the collection. During this work nearly 2,000 duplicates were prepared and sent to the Royal Botanic Gardens, Kew.

FOREST ECONOMICS

Mr. J. J. MacGregor continued in charge of this section. At the end of 1952 Mr. W. E. S. Mutch resigned to take up the post of Lecturer in Forestry at Edinburgh University and his place was taken by Mr. A. W. Simpson.

Teaching. Courses of lectures and tutorials were provided for the Honours School of Forestry on general economic theory, forest economics, and the optional subject of ' British forest law, land tenure and taxation.' Seminars based on study groups dealing with the main economic problems of three colonial regions were arranged for the Colonial Forest Officers. Lectures on the Law of Evidence and of Contract were provided for these officers by Mr. F. E. Davis of New College.

Research, etc. Much of the time available for research in this section has been concerned with the organisation of the survey of private forestry costs which involved the co-operation of over fifty estates in England and Wales. An *Introduction* was written to describe the scope and function of this survey and a First Annual Report was prepared to cover results for the year 1950/51. A Supplementary Report was also given which covered some costs made available for six post-war years.

Other research work has included the study of prices and supplies, the preparation of an article on timber statistics of the United Kingdom as part of a series on selected industries which is being prepared by the Royal Statistical Society. Some information was supplied to the Working Party on Forestry and Agriculture. An article on 'Economic Factors in United Kingdom Forestry', Research Section 31, was prepared for the International Union of Forest Research Organisations which is holding a conference in Rome during September, 1953.

The Working Party on Forestry and Agriculture of the Government Technical Committee on National Resources, on which the Forest Economist served, published its final draft report.

In the Long Vacation the Forest Economist attended the International Conference of Agricultural Economists which visited Quebec and Ontario in Canada and Michigan and Illinois in U.S.A. Discussions were held with forest economists in U.S.A. and in Canada.

COLONIAL FOREST ADMINISTRATION

The usual course of lectures for undergraduates who hope to enter the Colonial Forest Service was given by Mr. N. V. Brasnett, and was attended also by some of the serving officers. Many of the dis-

cussions in the officers' course were concerned with aspects of the subject, such as colonial forestry development, farm forestry, constitution and consolidation of forest reserves, local forestry education, fire and forestry, records and reports on operations, catchment protection, timber grading, local sawmills, sustained yield management in tropical forests, and local government forestry. These discussions play a valuable part in disseminating recent experience in individual territories, and give useful experience in handling meetings to the officers who preside in turn under the supervision of Mr. Brasnett and the Professor.

FOREST UTILISATION AND ENGINEERING

Colonel A. H. Lloyd continued in charge of the section and gave courses of lectures in forest utilisation and engineering as usual to first and second year students. Practical work and demonstrations included road alignment and bridging.

A short course of lectures was also given to probationers and forest officers on road construction, forestry tools and equipment, and methods of timber extraction. Films on mechanical logging in tropical countries and of cableway extraction in Europe were shown during the course.

A special lecture was given by Mr. J. D. Braithwaite, of Messrs. Wm. Mallinson and Sons Ltd., on 'The Relation between the Timber Trade and Colonial Forest Management'; this lecture was published later in various timber trade journals. A lecture entitled 'Some Aspects of the Industrial Use of Timber' was given by Mr. J. R. Aaron of the Timber Development Association Ltd., which dealt particularly with the timber used in water-cooling towers.

Forest officers and probationers, and final year students, attended the annual special course of lectures and demonstrations at the Forest Products Research Laboratory. Special arrangements were made on this occasion for individual discussions between the visiting forest officers and the officers in charge of the various sections of the Research Laboratory. This enabled the forest officers to raise questions relating directly to their own territories, and special thanks are due to the Laboratory staff for giving up so much time to these discussions. We again have to thank the Director and his staff for arranging this course and giving an opportunity to our forest officers to see the many aspects of utilisation dealt with at the Laboratory.

Messrs. W. W. Howard Bros. and Company's sawmills in Southampton, and Messrs. Wm. Mallinson and Sons' Ltd. timber yards and veneer showrooms in London, were visited during the summer term and our thanks are due to these two well-known firms for receiving our forest officers again this year. Seasoning kilns and woodworking machinery at High Wycombe were also visited.

In the summer term a special demonstration of logging and sawmilling equipment was held at Bagley Wood. The new Oliver logging arch was shown in operation in the removal of thinnings from a conifer

plantation and also in extracting heavy oak logs. A new type of portable bandsaw for breaking-down timber up to ten feet in girth was brought over from France especially for the demonstration. It was the first time this bandsaw had been seen in Great Britain and its portability and efficiency in operation attracted much attention. Other machinery demonstrated included the McConnell portable circular saw, a one-man chain-saw and mechanical post-hole digger, and a tree was felled by the Trewhella Winch.

During the continental tour to Austria, new methods of forest road construction were seen, during which rock blasting on a large scale was demonstrated. Timber extraction with various types of tractors and trailers was demonstrated and also the use of forestry tools and other equipment. Visits were also paid to modern saw-mills and fibre-board plants in Austria.

During the forest officers' and probationers' tour in Great Britain, Mr. Gordon Jacob gave a demonstration at his sawmill and fibre-board plant at Queensferry, and of extraction and transport of thinnings at Lake Vyrnwy. In the Easter Vacation Colonel Lloyd attended the first installation of a Wyssen Cableway in Great Britain, in a Foresty Commission plantation in Argyllshire. He also visited forests in North-East Scotland felled by the great storm early in the year to study the methods of extraction and rapid conversion of the timber. He also visited the experimental cableway installed in the Dovey Forest in W. Wales, and the extensive new road construction by the Forestry Commission in the same area.

FOREST PROTECTION

The usual course of lectures in fire protection and counter-erosion work was given to first year students.

During the Austrian tour counter-erosion work was visited, including the construction of stone weirs and torrent control works. Unfortunately there was a torrential storm during our visit which washed away several bridges and mountain roads, making access impossible to forest protection work at the head of the valley on the following day—but the mischance gave an excellent illustration of the need for protection work on steep slopes.

SURVEYING

Mr. A. R. Robbins, University Lecturer in Surveying, gave the usual course on surveying in the Trinity Term.

The usual course in aerial survey was given to the postgraduate students by Mr. A. R. Robbins and Dr. G. W. Dimbleby.

LIBRARY

Miss G. Guiney continued in charge of the Library, having done so since 1925.

Statistics for the year, with figures from the previous year in brackets, are given:

Accessions:

Issues of periodicals	1,975	(1,914)
Books	170	(266)
Other items	1,750	(1,655)
Total	3,895	(3,835)

One book (3) was purchased through the Brooks Memorial Fund. The Commonwealth Forestry Bureau provided 330 (281) items, and 234 (258) were obtained by request from other institutions, both British and foreign.

Loans:

To staff, direct 838 (266); in circulation, 2,075 (2,642)	2,913	(2,908)
To students	1,890	(1,284)
To Bureau staff	591	(459)
To visitors and correspondents ...	578	(634)
Total	5,972	(5,285)

New periodicals. Fifteen: three English, two from the United States, and one each from Belgium, Ceylon, Germany, Indonesia, Italy, Israel, Japan, Nigeria, Thailand and Switzerland.

New series. Seventy-three. Amongst countries providing these are Ceylon, Czechoslovakia (2), Finland (4), France (2), Germany (4), India (4), Iraq, Israel, Italy, Morocco, Ryuku Islands, Sarawak, Thailand, Uruguay, Yugoslavia.

Correspondence. Letters sent, 1,892 (1,860); received, 1,131 (1,052).

Sales. The total of £154 3s. 3d. (£195 10s. 7d.) for this year represents only our own publications sold, either in the Library or by post.

Catalogue Room. The increasing quantity of forestry literature surveyed by the Commonwealth Forestry Bureau has resulted in a record number of cards being filed in the Institute's Bibliography. When work on the Bibliography was started in 1946/47, the annual intake was 13,207; during the year under review the number had risen to 20,513. Arrears dealt with under the Flury classification number 1,478.

In addition, 49,147 cards of 'flimsies' have been reproduced on the spirit duplicator for distribution under the Bureau's Title Service. These titles have been distributed among eighteen subscribers in nine countries, *viz.*, Canada, New Zealand, India, Pakistan, Australia, Fiji, Finland, the United Kingdom and the United States of America,

and the Food and Agriculture Organisation of the United Nations (Rome).

Finland	5,473
Fiji	5,092
Pakistan	5,493
Madison F.P.R.L.	4,408
Vancouver	914
Bureau (Shadow set)	1,556
Alice Holt	3,562
F.D.C.	1,811
India	5,353
Canada (before Departments separated) ...	2,255
Victoria, B.C.	3,063
D.F.P., Canada	695
F.A.O.	1,911
New Zealand	4,473
Madison Library	1,497
Ottawa	914
T.D. & P. Association, India	516
Melbourne	171

Many of the above have only recently taken the title service. The service is being more widely requested and the number of cards may well be doubled during the next twelve months, increasing the work of the Catalogue Room.

Staff. There were two resignations and one new appointment was made. Mr. W. W. Dienemann was appointed in November as Assistant Librarian. Mr. Smythies completed certain re-arrangements of material.

Demonstrations of library routine were given to groups of Forest Officers and to first-year students at the beginning of the year. Exhibitions were arranged for special occasions, notably for the Rhodes House Centenary visitors.

General. Among various activities of the year may be mentioned the collecting into special shelves of our few but interesting old books, for protection from handling ; the collection and cataloguing of maps, still hampered by lack of suitable storage space ; and a microfilm and photostat collection was begun. Some arrears of war-time binding were made up but the cost of binding has limited what could be done.

Library Bulletin. The Bulletin appeared as usual six times during the year, and may in future be somewhat oftener.

Gifts. The kindness of donors, including the many institutions and persons who responded to requests, is most gratefully acknowledged. Special mention must be made of the presentation by Mrs. W. W. Aspin of a sum of money in memory of her daughter, Miss Isabel Aspin, formerly Assistant Librarian : no conditions were attached and it was decided to purchase one or two good pictures for the Librarian's room ; a crayon drawing by Mr. A. Utin has already been acquired, and another picture is under consideration. Mrs.

Aspin also gave the library a framed original Blaeu map (*c.* 1630) of Oxfordshire, which belonged to Miss Aspin. Among the donors of books, to whom thanks are due, were Mr. N. V. Brasnett, for an advance copy of his book *Planned Management of Forests;* Mr. W. A. Robertson for nine books of immediate utility: the Director, Landeskammer für Land-und Forstwirtschaft, Graz, Austria, for a copy of the unusually beautiful and informative Steirische Waldatlas; Monsieur E. Paris, Ingénieur Principal des Eaux et Forêts, for an otherwise unobtainable copy of a 1942 issue of the Revue des Eaux et Forêts, completing our set for that year; Dr. A. P. Kelley, Landenburg, Pennsylvania, for his paper on 'The Chestnut Blight and its Relation to the Principle of Disease Resistance'; Mr. G. S. Cansdale for his book on *Animals and Man;* Professor Dr. F. Schwerdtfeger, Sieber, Harz, Germany, for several of his works; Mr. D. R. Rosevear for his book *Check-List of Nigerian Mammals, with a Foreword on Vegetation;* Captain H. S. Blunt for ten volumes of the *Indian Forester;* the General Director, Escuela Politécnica del Ejercito, Madrid, for several publications; and M. le Directeur, Institut Français d'Afrique Noire, for two works of special value to our readers. The Forestry Commission maintained its courtesy in sending its publications as issued.

PHOTOGRAPHIC SECTION

Demands on the Photographic Section continue to be heavy, the record numbers of 5,575 prints and enlargements having been processed, 379 photograph and photomicrographs taken, and 162 lantern slides made, in addition to the processing of 1,258 negatives and various miscellaneous jobs including hand colouring lantern slides and the production of measuring graticules.

Repairs and additions to the photo collection have continued, and several thousand reference cards have been added to the new lantern slide subject and geographical index, which is almost completed.

The maintenance of the projection equipment and its operation for lectures, etc., fall to the section, as also the duplicating work which has again amounted to approximately 50,000 impressions.

WORKSHOPS

The Workshops continued with two metal-workers, Mr. E. J. Howell and Mr. G. A. Jones, and one wood-worker, Mr. J. Howkins. The chief items constructed during the year were:

Metal-work:

Stand for Warburg manometer
One mechanical stirrer
One aspirator bottle stand
One 'all-metal' guillotine
One Keldjahl digestion apparatus stand
One low pressure chamber with attachments
One water agitator for print washing

Four hand microtomes
Three specimen manipulators for use with microscopes
One micro-mill for grinding small samples of plant material

Wood-work:

Book stack and small cupboard for working plans
Large set of storage racks with sliding doors
Four-drawer negative file in oak
Wood specimen storage cabinet containing 32 trays
Dish rack and bench for glazing machine
Three wooden letter trays in Muninga
Twenty-slide material boxes for Pathology Laboratory
One lecture room bench desk in Muninga
Eight cork faced notice boards
Eighteen wood collection boxes
Two picture frames in Stinkwood

APPENDIX I

PUBLICATIONS

GENERAL

Original Publications

Forestry in Post-war India and Pakistan, by H. G. Champion. *British Agricultural Bulletin,* Vol. 6:50–9.

Forestry Development in Great Britain, the Commonwealth and Europe in 1952, by A. H. Lloyd. *Encyclopaedia Britannica 'Book of the Year' for 1953.*

Reviews

Forestry and its Career Opportunities, by H. L. Shirley. *Journal of Ecology*, Vol. 41:398–9. *(H. G. Champion.)*

Textbook of Silvicultural Systems, by R. S. Troup. Second Edition, by E. W. Jones. *Nature*, Vol. 170:816. *(H. G. Champion.)*

Activities of F.A.O. under the Expanded Technical Assistance Programme 1950–51. *Empire Forestry Review*, Vol. 31:331–2. *(N. V. Brasnett.)*

Journal of Forestry, Vol. 50, 1952. *Empire Forestry Review*, Vol. 31: 237–8. *(N. V. Brasnett.)*

Administrative Reports: Uganda Protectorate, 1951, *Empire Forestry Review,* Vol. 31:347-8; Kenya, 1948, 1949, 1950, *Empire Forestry Review*, Vol. 32:90–2. *(N. V. Brasnett.)*

SILVICULTURE

Original Publication

The Flora of Tree Boles, with special reference to the effect of smoke, by E. W. Jones. Journal of the *Oxford University Forestry Society*, 1953, No. 1.

Reviews

A Silvicultural Experiment in the Cameroons, by J. Morrellet, Bois et Forêts des Tropiques 25, 1952. *Empire Forestry Review*, Vol. 32: 179. *(N. V. Brasnett.)*

The Tropical Rain Forest, by P. W. Richards. *The New Phytologist*, 52: 190–191. *(E. W. Jones.)*

Die Fagion-Gesellschaften im Schweizer Jura, by Moor, Max. *The Journal of Ecology*, Vol. 41:403-4. *(E. W. Jones.)*

Report on Forest Research for the year ending March, 1951. *Forestry*, XXVI:142–5. *(E. W. Jones.)*

Girdling or Binding as a Means of Increasing Cone Production in Pine Plantations, by G. D. Holmes and J. D. Matthews. *Quarterly Journal of Forestry*, XLVI:136. *(E. W. Jones.)*

ECOLOGY

Original Publications

Soil Regeneration on the North-east Yorkshire Moors, by G. W. Dimbleby, *Journal of Ecology*, 40:331–41.

The Historical Status of Moorland in North-east Yorkshire, by G. W. Dimbleby, *New Phytologist*, 51:349–54.

Natural Regeneration of Pine and Birch on the Heath Moor of North-east Yorkshire, by G. W. Dimbleby, *Forestry*, 26:41–52.

FOREST PATHOLOGY

Reviews

A Review of Work on Indian Tree Diseases and Decay of Timber and Methods of Control, by Dr. K. Bagchee (Paper presented at the Sixth British Commonwealth Forestry Conference). *Empire Forestry Review*, 32:167. *(W. R. Day.)*

India, by V. S. Krishnaswamy (a paper reviewing damage by animals and methods of its control). (Paper presented at the Sixth British Commonwealth Forestry Conference.) *Empire Forestry Review*, 32:167–8. *(W. R. Day.)*

Typed Reports

Studies on the Dying of Spruces and on Depth of Rooting in relation to Root Diseases and Butt Rot. *Forestry Commission Research Branch No. 4*, Duplicated for Departmental Circulation.

Sitka Spruce in the Forests of Graham Island and in the Region of Terrace, British Columbia, its Place in the Forest in relation to Soil, Topography and Climate. (Being the first report on the field work carried out in British Columbia.) (Copies have been sent to:

The B.C. Forest Service,
The Forestry Commission,
Dr. J. E. Bier, Associate Chief, Division of Forest Pathology, Science Service, Department of Agriculture, Ottawa.)

Minor Reports

A. Field Notes, by F. H. Jones : Comment by W. R. Day.
Notes on Root Development and Soil Conditions in connection with the Dying of Norway and Sitka Spruce and Drought Crack of Sitka Spruce.
The Occurrence of Basal Cankers on Norway and Sitka Spruce.
The Dying of Lodge Pole Pine in Kielder Forest.

B. By D. K. Barrett, under supervision of W. R. Day.
Cambial Injuries on the Main Sites of European Larch at Dolfwnog, Coed-y-Brenin.
Report on Necrosis of Bark on Main Stems of Japanese Larch in Allerston (1) Forest, Yorkshire.
Observations on Local Climates at Dolddeuli, Rhydymain Section, Coed-y-Brenin ; in Relation to Main Stem Necrosis of Japanese Larch.

FOREST ENTOMOLOGY

Original Publication

Forest Entomology in Canada, by G. H. Thompson. Journal of the *Oxford University Forest Society*, 1953, No. 1.

Reviews

Forest Entomology, by S. A. Graham, Third Edition, 1952. *Entomologist's Monthly Magazine,* LXXXIX:xv. (*G. H. Thompson.*)

Poplars, by T. R. Peace, Forestry Commission Bulletin, No. 19. *Entomologist's Monthly Magazine,* LXXXIX:xxviii. (*G. H. Thompson.*)

FOREST MANAGEMENT

Original Publication

Flexibility in Forest Management, by N. V. Brasnett. *Empire Forestry Review*, 32:142–3.

Reviews

Forest Management, by H. A. Meyer, A. B. Recknagel, and D. D. Stevenson. *Empire Forestry Review*, 31:333–4. *(N. V. Brasnett.)*

Working Plan for the Matang Mangrove Forest Reserve, Perak, by D. S. P. Noakes. *Empire Forestry Review*, 31:338–9. *(N. V. Brasnett.)*

WOOD STRUCTURE

Original Publication

Variation of density in stems of Douglas Fir, by L. Chalk. *Forestry*, 26:33–6.

FOREST ECONOMICS

Original Publications

Economic Factors in United Kingdom Forestry, by J. J. MacGregor, prepared for Research Section 31 of the International Union of Forest Research Organisations, for Conference in Rome, September, 1953.

World Timber and Pulp — Requirements and Supplies, by J. J. MacGregor. *World Crops*, 5:93–7.

An Introduction to the Survey of Private Forestry Costs in England and Wales, by J. J. MacGregor. Imperial Forestry Institute, Department of Forestry, University of Oxford, March, 1953. 16 pp.

Survey of Private Forestry Costs, England and Wales, by J. J. MacGregor. First Annual Report, 1951/52, including supplementary report for 1945/7 to 1951/2. Imperial Forestry Institute, Department of Forestry, University of Oxford, March, 1953. 21 pp. plus tables.

Timber Statistics in the United Kingdom, by J. J. MacGregor. (To be published in Part III of the Journal of the Royal Statistical Society, 1953.)

Recent Trends of United Kingdom Timber Supplies, Costs and Prices, by J. J. MacGregor. *Quarterly Journal of Forestry*, 47: 180–7.

Europe's Wood Consumption in Housing and Construction, Part I, by J. J. MacGregor. *Wood*, 18:256–8.

Reviews

An Analysis of Investments in Pruning, by Elmer W. Shaw and George R. Staebler. *Empire Forestry Review*, 32:180–1. *(J. J. MacGregor.)*

European Timber Trends and Prospects. A Study prepared jointly by the Secretariats of the Food and Agriculture Organisation of the United Nations and the United National Economic Commission for Europe, Geneva, 1953. *Wood*, 18:218–221. *(J. J. MacGregor.)*

Research in Economics of Forest Management, by Karl V. Algvere. (To be published in *Forestry*). *(J. J. MacGregor.)*

Research in the Economics of Forestry, edited by W. A. Duerr and H. J. Vaux, Charles Lathrop Pack Forestry Federation, Washington, D.C., 1953, 475 pp. *Empire Forestry Review*, 32:261–3. *(J. J. MacGregor.)*

FOREST UTILISATION AND ENGINEERING

Original Publication

Recent Developments in the Design and Use of European Gravity Cableways for the Extraction of Forest Produce, by A. H. Lloyd. *Forestry Abstracts*, 14:4–9.

Reviews

Logging Mechanization in U.S.S.R., by A. Koroleff. Pulp and Paper Research Institute of Canada, 1952. *Empire Forestry Review*, 32:177–8. *(A. H. Lloyd.)*

Kiln Operator's Handbook, by W. C. Stevens, and G. H. Pratt, of the Forest Products Research Laboratory. *Quarterly Journal of Forestry*, 47:144–5. *(A. H. Lloyd.)*

Die Praxis des Neuzeitlichen Holztransportes, by Dr. Ing. Franz Hafner. *Quarterly Journal of Forestry*, 47:66–7. *(A. H. Lloyd.)*

Record of the 1952 Annual Convention of the British Wood Preserving Association, Cambridge. *Quarterly Journal of Forestry*, 47:149. *(A. H. Lloyd.)*

Fire Protection in Victoria, Australia, by E. R. Torbet. *Empire Forestry Review*, 32:165. *(A. H. Lloyd.)*

Forest Fire Protection in Ontario, by T. E. Mackey (British Commonwealth Forestry Conference). *Empire Forestry Review*, 32. 166. *(A. H. Lloyd.)*

APPENDIX II

STAFF

I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH

Professor H. G. Champion, C.I.E., M.A., D.Sc. (Oxon.). Tropical Forestry, Forest Policy.
L. Chalk, M.A., D.Phil. (Oxon.). Wood Structure and Properties.
W. R. Day, B.Sc., M.A. (Oxon.). Pathology, Forest Hygiene.
A. H. Lloyd, O.B.E., M.C., T.D., M.A. (Oxon.). Forest Engineering and Utilisation.
G. H. Thompson, B.Sc., M.A. (Oxon.). Forest Zoology, Entomology.
N. V. Brasnett, M.A., Dip. For. (Cantab.). Forest Management, Colonial Forestry.
T. E. Edwardson, M.A. (Oxon.), B.Sc. (For.) (Edin.). Mensuration, British Forestry.
J. J. MacGregor, B.Sc. (Glasgow), M.S. (Wisc.), B.Litt., M.A. (Oxon.). Forest Economics.
E. W. Jones, M.A. (Oxon.), Ph.D. (Cantab.). Silviculture.
W. R. C. Handley, M.A. (Oxon.), Ph.D. (Leeds). Microbiology.
L. Leyton, M.A. (Oxon.), Ph.D. (Leeds). Tree Physiology.
G. W. Dimbleby, M.A., D.Phil. (Oxon.). Forest Ecology.
F. White, B.A. (Cantab.). Forest Botany.
A. Angus, B.Sc. (Edin.). Forest Botany.
P. J. Rennie, B.Sc. (Lond.). Soil Research.

II. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN INSTRUCTIONAL WORK

A. C. Hoyle, B.Sc., M.A. (Oxon.). Forest Botany and Ecology.
E. W. Russell, M.A. (Oxon.), Ph.D. (Cantab.). Soil Science.
G. R. Clark, B.Sc., M.A. (Oxon.). Soil Science.
A. R. Robbins, M.A. (Oxon.). Surveying.
J. M. Hammersley, M.A. (Oxon.). Statistical Methods.

III. OTHER STAFF

Secretary: Miss H. M. Edwards
Assistant Secretary: Miss I. Blagrove
Accountant: Mr. A. A. Adams
Librarian: Miss G. Guiney
Assistant Librarians: Mr. W. Dienemann, B.A. (Oxon.), A.L.A.
Mr. E. F. Hemmings